

# Assembly

## Joint Assembly

Many of the questions you may have about assembling Orion No-Hub/Plain End, socket fusion and electrofusion systems are answered in this section. However if, after reading this section you still have questions, please call our technical department at (913) 342-1653, 8:00 am – 4:30 pm, Monday-Friday, Central Time.

## Cold Weather Assembly

As with all types of plastic piping systems, installation in cold weather can be difficult and therefore is not recommended at temperatures below 40 degreesF unless proper precautions are taken.

In cold weather installations, the area being installed must be shielded from the wind and other outside elements and the joints must be covered with heating blankets, prior to being installed.

If joints are installed in cold weather, they may be difficult to seal. In addition, if above ground systems are installed in cold temperatures and the area is later heated; the system will expand, possibly causing undue stress on the entire system. In view of this, special care must be taken when designing and installing any plastic piping system in cold weather. The above information applies to SocketFusion, Electrofusion and No-Hub/Plain End systems.



A socket fusion tool kit, including heat tool and various sizes of heads is available from Orion.

Note:

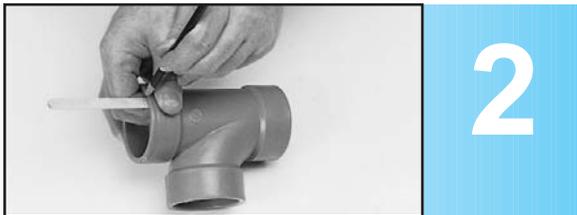
- Make all field cuts of pipe square and true using a pipe cutter designed for plastic pipe.
- Make certain heads are installed properly on heat tool. Heads are marked "M" and "F", indicating male and female.
- Bevel the leading edge of each pipe section with a 1/8" 45 degree chamfer. This will minimize the amount of bead on the inside of the fitting when fused



# 1

### STEP 1

Check the heads for proper temperature (482 - 520°F or 250°- 270°C ). If necessary, adjust the thermostat dial so that the 488°F Tempil stick burns, but the 525°F does not. **NOTE: The newest Orion fusion tools may have a temperature dial in degrees celcius which has a maximum temperature of 300°C. If this is the case, see temperature conversion chart below.** Heat tools are factory set, however settings can vary due to factors such as weather, current variances, cord lengths, generators, etc. These variables should be checked on site. To increase tool temperature, turn dial "in" (clockwise). To decrease, turn screw "out" (counterclockwise).



# 2

### STEP 2

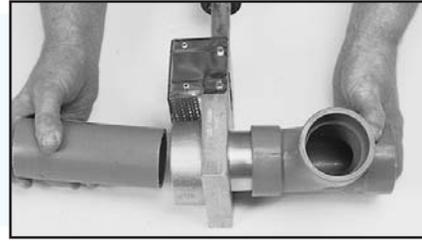
Measure depth of fitting. Subtract 1/16".



# 3

### STEP 3

Transfer measurement to pipe. Mark pipe with measurement obtained in Step 2.



# 4

### STEP 4

Insert fitting on the male side of the heat tool. Then insert pipe on the female side. Do not insert past the mark on the pipe.

### STEP 5

Keep pipe and fitting absolutely straight on heat tool.

Use the chart below to determine how long to leave the pipe and fittings on the heater bushings. It should be noted that pipe and fittings will normally have a slight interference with the fusion tools. However, if the pipe and/or fittings do not fit tightly on the heater bushing, the heating time should be started when the components have swelled to just contact the surface of the bushing.



# 6

### Step 6

Hold joint under pressure for 15 seconds to allow surfaces to fuse. Do not stress joint until fully cooled.

Clean any melted material from heater bushings using a cotton rag. Do not use abrasive materials to clean the heater bushings.

Confirm the heater bushings are the correct temperature before fusing next joint.

The following chart shows the approximate time that the pipe and fitting should be held on the heater bushings. These times are a guideline only. It may be necessary to increase or decrease times to obtain the correct melt conditions.

Fusion Times in seconds

	1-1/2"	2"	3"	4"	6"
PP	12-15 sec	15-20 sec	20-25 sec	25-30 sec	30-35 sec
PVDF	12-15 sec	15-20 sec	20-25 sec	25-30 sec	30-35 sec

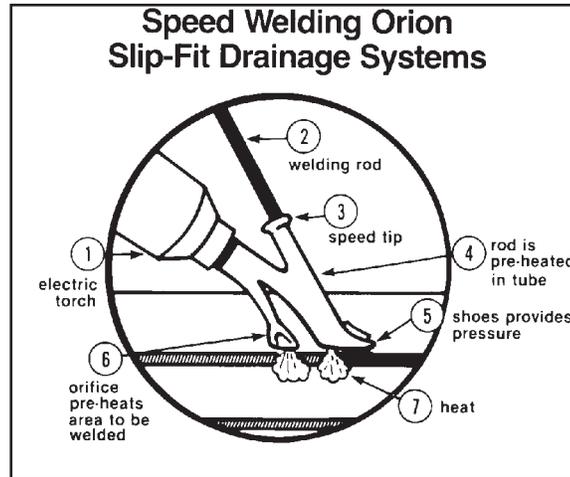
### Temperature Conversion Factors

°F = Degrees in Farenheight
°C = Degrees in Celcius(Centigrade)
°F = (°C x 1.8) + 32
°C= (°F - 32) x .555

°F	°C
122	50
212	100
300	150
392	200
482	250
520	270
572	300

**NOTE: DO NOT TEST ANY ORION PIPING SYSTEM WITH COMPRESSED AIR OR GASSES. TEST HYDROSTATICALLY ONLY**

## Slip Fit and Backwelding (Hot Gas Welding)



### Hot Gas Welding (Backwelding)

Hot-gas welding (Backwelding) is a method used primarily as a means of joining certain outer components such as closure joints where one of the other methods described above are not suitable or possible. 12" Polypropylene as well as any other PVDF couplings require the slip fit and backweld method. Performing field pipe repairs may also require backwelding. This method involves the use of a welding rod filler material matching that of the material being joined. The filler material, and immediate surfaces to be joined are heated by means of a hot gas, usually air or nitrogen, and then the filler material is pressed into place along the surfaces to be joined. With hot gas welding, multiple passes are usually required. Orion's speed (hot gas) welding technique, used in slip-fit systems, is shown above. When Backwelding is required, the contractor should be thoroughly trained prior to making field joints.

### Welding Procedure

When a backwelding kit is purchased from Orion, a complete booklet on Hot Gas welding is included. An overview of those welding procedures is summarized below. (The following guidelines summarize the procedures used for backwelding with Orion's speed tip

Line up the area or the two parts that are to be welded together. Make sure that the surfaces are clean, oil and water free. Gently preheat the area where the weld is to be started by holding the Orion welding Gun near the surface and fanning the area. Now feed the welding rod into the preheat chamber of the speed tip. This will start to soften the welding rod. Preheat both the softened welding rod and the area to be welded for about 5-6 seconds. Gently push the welding rod through the preheat chamber out of the front of the nozzle laying it down with pressure on the area to be welded. **DON'T STOP THE MOTION** just gently work the rod through the preheat chamber and in a slow, fluid motion along the weld until the desired seam is completed. The welding gun should always be held at approximately a 45 degree angle from all surfaces. Typically a triple weld is required and therefore 3 complete passes should be performed.